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**Docket 82391AJA**
**Customer No. 01333**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**
**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

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|---|---|
| In re Application of | Group Art Unit: 2675 |
| Ronald S. Cok | Examiner: Chanh Duy Nguyen |
| A DYNAMIC CONTROLLER FOR ACTIVE-MATRIX DISPLAYS | I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450. |
| Serial No. 09/817,547 | Deidra L. Mack<br>Deidra L. Mack |
| Filed 26 March 2001 | Date July 26, 2005 |

Mail Stop APPEAL BRIEF-PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

**APPEAL BRIEF TRANSMITTAL**

Enclosed herewith is Appellants' Appeal Brief for the above-identified application.

The Assistant Commissioner is hereby authorized to charge the Appeal Brief filing fee to Deposit Account 05-0225. A duplicate copy of this letter is enclosed.

Respectfully submitted,

Attorney for Appellants
Registration No. 33,564

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PATENT & TRADEMARK OFFICE

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Sir:

**APPEAL BRIEF PURSUANT TO 37 C.F.R. 1.192**

Applicants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejection of claims 1-19 which was contained in the Office Action mailed January 25, 2005.

A timely Notice of Appeal was mailed with certificate of first-class mailing May 25, 2005 (with one-month extension of time), and received at the PTO OIPE May 27, 2005.

Respectfully submitted,

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## Real Party In Interest

The Eastman Kodak Company is the assignee and real party in interest.

## Related Appeals And Interferences

No appeals or interferences are known which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

## Status Of The Claims

Claims 1-19 are pending in the application.

Claims 1-19 stand rejected under 35 USC § 103.

Claims 1-19 are being appealed.

Appendix I provides a clean, double spaced copy of the claims on appeal.

## Status Of Amendments

No amendment has been filed after the Final Rejection dated January 25, 2005.

## Summary Of Claimed Subject Matter

As set forth in independent claim 1, the present invention is directed towards a dynamic controller (8) for a light emitting active-matrix display (14), the display being responsive to code values (12) for producing a light output, comprising: a) a photosensor (15) located on the display for sensing the light output from the display and generating a feedback signal (42) representative thereof; b) a feedback signal converter (46) for converting the feedback signal to a converted feedback signal (44) having the same form as the code value; c) a code-value corrector (18) including a memory responsive to a code value for producing a corrected code value (26); and d) an update calculator (48) for creating an updated corrected code value (49) by

combining the converted feedback signal with the corrected code value, and storing the updated corrected code value in the memory. The present invention thus relies upon a feedback loop employing a converted feedback signal generated by a sensor on the display device to update a corrected code value used to adjust the display output. The controller of the present invention is referred to as a "dynamic" controller because the adjustments applied by the controller change over time as the feedback signal changes over time in response to changes in the characteristics of the display device (see, e.g., page 5, lines 19-29). Because the present invention relies upon actual feedback and updated correction code values rather than a model of the active-matrix device behavior, it can be applied with few or no changes to a wide variety of devices. For example, if the light-emitting materials change or device-to-device variability is significant, no change to the design is necessary and the present invention will properly correct for any changes or variability (page 2, lines 12-17).

## Grounds Of Rejection To Be Reviewed On Appeal

The following issues are presented for review by the Board of Patent Appeals and Interferences:

1. Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salam (U.S. Patent No. 6,081,073) in view of Shen et al (U.S. Patent No. 6,414,661 B1).

2. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Salam in view of Shen, as applied to claim 1 and further in view of Holloman (U.S. Patent No. 6,097,360).

## Arguments

### *Obviousness Rejection of Claims 1-18 by Salam in view of Shen et al*

While acknowledging that Salam does not teach an update calculator for creating an updated corrected value by combining a converted feedback signal with a corrected code value and storing an updated corrected code value in memory as required by the present claimed invention, the Examiner states that Shen teaches an updated calculator (16-18) for creating an updated corrected code (i.e. digital value of the current

$I_{N+1}$ stored in RAM 20) by combining the converted feedback signal (e.g., $I_o\tau_o$ generated by CCD camera; see column 3, lines 4-12) with the corrected code value ($I_N$), and storing the updated corrected code value ($I_{N+1}$) in the memory (see column 3. lines 1-12, column 6, lines 16-39, column 7, lines 9-15). The Examiner further states that Shen teaches a feedback loop providing converted feedback signal (e.g., $I_o\tau_o$) generated by a sensor (e.g., CCD camera) on the display device to update a corrected code value ($I_N$ to $I_{N+1}$) as the same way as Applicant's disclosed device (see Figure 2 of Shen), and that it would have been obvious to one of ordinary skill in the art at the invention was made to have used the update calculator of Shen to the microprocessor of Salam because the update calculator of Shen provides rapidly and accurately correct resulting non uniformities of an initially calibrated display during its life (see column 2, lines 48-56 of Shen).

As discussed in the Summary of Claimed Subject Matter above, the present invention is directed towards a dynamic controller that relies upon a feedback loop employing a converted feedback signal generated by a sensor on the display device to update a corrected code value used to adjust the display output. Contrary to the Examiner's assertion, Shen does not combine a feedback signal from the display with a corrected output signal to form a new signal, as there is no feedback loop based on actual display light emissions which enables compensating for actual changes in the display performance over time. Shen instead accumulates the drive current sent to the display, and uses the accumulated drive current to modify the initial condition signal $I_o\tau_o$. This is not feedback based on actual display performance sensed by a photosensor. Figs. 2 and 3 do not illustrate any signal from the display. Fig. 3 shows the exponentiation circuit 18 of Fig. 2 in more detail. In Figs. 2 and 3, there is no feedback signal driving the multiplier 19, rather an accumulated value is applied. Moreover, in reviewing Fig. 9 (an alternative embodiment), there is no signal that goes from the voltage sensor 94 that is combined with an output from the RAM 91. Hence, Shen again does not combine a feedback signal from the display with a corrected output signal to form a new signal. The Examiner cites col. 3, lines 1-12 (which relates to estimating correction or aging values and stores them as Examiner states) and col. 6, lines 16-39 (which talks about storing the values and then applying them to the display). Note, however, that there is no reference to combining any corrected values with a feedback signal to form an iterative process as described in the present invention. Col.

7, lines 9-15 describe a combination of the output values from the memory but then directs this value to the memory as shown in Fig. 2. Again, there is no combination with a feedback signal as required in the present invention. Simply put, there is no feedback loop wherein corrected code values associated with a desired display output are updated based on a converted feedback signal having the same form as the code values obtained from an actual measurement of the light output from the display. This is necessarily so as Shen fails to provide any measurement of the actual light output of the display beyond the initial $I_0\tau_0$ calibration. A close examination of Shen confirms that there simply is no feedback loop as described and required in the present invention. The proposed combination of Shen and Salam accordingly can not result in the present claimed invention. Reversal of this rejection is accordingly respectfully requested.

In response to the above arguments as basically set forth in Applicant's Response filed September 20, 2004, and specifically in response to Applicant's argument that the present invention relies upon actual feedback and updated correction code values rather than a model of the active matrix device behavior, the Final Rejection mailed January 25, 2005 states that it is not clear what is the difference between the circuit feedback of Salam and the claimed invention. Such statement is not understood, however, as the Examiner has acknowledged that Salam does not teach an update calculator for creating an updated corrected value by combining a converted feedback signal with a corrected code value and storing an updated corrected code value in memory as required by the present claimed invention. Thus, a difference between the teachings of Salam and the present claimed invention has in fact clearly been identified. While Salam may describe various brightness, current, and/or voltage measurement schemes for achieving matched luminance between multiple LED lamps in a display matrix, it simply does not teach or suggest use of a feedback signal converter for converting a measured light output feedback signal to a converted feedback signal having the same form as the code values to which the display is responsive in combination with an update calculator for creating an updated corrected code value by combining the converted feedback signal with a corrected code value as required by the present claimed invention. As Shen also fails to provide such teaching, the combination proposed by the Examiner clearly fails to establish a prima facie case of obviousness.

The Examiner further argues in the Final Rejection mailed January 25, 2005 that the limitation of compensating for actual changes in the display performance

over time is not recited in the claim. Such position is without merit, as claim 1 expressly refers to the use of a dynamic controller for a light emitting active-matrix display that is responsive to code values for producing a light output, comprising a photosensor (which generates a feedback signal), feedback signal converter (which converts the feedback signal to a converted feedback signal having the same form as the code value), code-value corrector (responsive to a code value for producing a corrected code value), and update calculator (creates an updated corrected code value by combining the converted feedback signal with the corrected code value), where updated corrected code values are stored in the memory of the code-value corrector. The ability to compensate for actual changes in the display performance over time is an inherent property when such components with specified interrelations are employed in combination. In any event, whether expressly recited in the claim or not, such capability is an advantage of claimed components employed in combination, and must be considered when assessing obviousness of the claimed combination.

The Examiner further references in the Final Rejection mailed January 25, 2005 Shen column 8, lines 64-68 (using CCD camera for measuring the light output of the pixels of a display device) as support for the position that Shen is directed towards sensing actual display performance by a photosensor. While such cited portion of Shen does relate to the use of CCD cameras for the purpose of calibrating individual pixels of a display device, such disclosure is with respect to initial calibration or recalibration of the pixels of a display device, not with respect to use in a dynamic controller in accordance with the present invention. There is still no teaching in Shen of a dynamic controller employing a feedback signal from the display with a corrected output signal to form a new signal, as there is no feedback loop based on actual display light emissions which enables compensating for actual changes in the display performance over time. The Examiner further notes that Shen teaches that "voltage sensing circuitry 94 is coupled to the display device 93 to measure the voltage across each image pixel as a current IN determined by the multiplexer/digital-to-analog converter (mux/DAC) 92 is applied to the pixel" (see column 7, lines 47-64), and argues that the correction value in Shen is not pre-stored as Applicant argues, but is based on measuring and calculating. As further explained at column 7, line 65 to column 8, line 12 of Shen, however, even here the correction applied according to Shen is still based on a stored preprogrammed function based on

expected exponential decay, rather than an actual feedback loop employing a light output feedback signal converter, code-value corrector, and update calculator as employed in the present invention.

### *Obviousness Rejection of Claim 19 over Salam in view of Shen and Holloman*

As to claim 19, the Examiner further notes that Salam and Shen do not mention the controller and the display device integrated on a common substrate, and states that it would have been obvious to one of ordinary sill in the art at the time the invention was made to have used a common substrate for such types of elements as taught by Holloman so that the display device is more compact. Holloman, however, further fails to overcome the basic deficiencies of the combination of Salam and Shen with respect to the claimed invention as discussed above. Reversal of this rejection is also therefore respectfully requested.

## Conclusion

For the above reasons, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the rejection by the Examiner and mandate the allowance of Claims 1-19.

Respectfully submitted,

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If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.

## Appendix I - Claims on Appeal

1. A dynamic controller for a light emitting active-matrix display, the display being responsive to code values for producing a light output, comprising:

a) a photosensor located on the display for sensing the light output from the display and generating a feedback signal representative thereof;

b) a feedback signal converter for converting the feedback signal to a converted feedback signal having the same form as the code value;

c) a code-value corrector including a memory responsive to a code value for producing a corrected code value; and

d) an update calculator for creating an updated corrected code value by combining the converted feedback signal with the corrected code value, and storing the updated corrected code value in the memory.

2. The controller claimed in claim 1, further comprising an intermediate memory for receiving and storing corrected data signals from the data signal corrector and supplying the corrected data signals to the display.

3. The controller claimed in claim 1, further comprising an intermediate memory for receiving and storing converted feedback signals from the feedback signal converter and supplying the converted feedback signals to the correction signal calculator.

4. The controller claimed in claim 1, wherein the feedback signal is an analog current signal and the converted feedback signal is a digital code value.

5. The controller claimed in claim 1, wherein the code values are supplied to the display device as analog signals, and further comprising a digital to analog converter for converting the digital signals to analog signals prior to applying the code value signals to the display device.

6. The controller claimed in claim 1, wherein the code values are supplied to the display as digital signals.

7. The controller claimed in claim 1, wherein the active-matrix display includes display pixels and a photosensor for each display pixel.

8. The controller claimed in claim 1, wherein the active-matrix display includes representative pixels and a photosensor for each representative pixel.

9. The controller claimed in claim 8, further comprising means for sending every code value to the representative pixel and producing a corrected code value for every code value.

10. The controller claimed in claim 1, wherein the display and the dynamic controller are partitioned into multiple units.

11. The controller claimed in claim 1, wherein the display device is a color display device and the dynamic controller includes a representative pixel and a photosensor for each color.

12. The controller claimed in claim 11, including a separate feedback signal converter, code-value corrector, and update calculator for each color.

13. The controller claimed in claim 1, wherein the display is a color display and the code-value corrector includes means for performing color transformations on the code values.

14. The controller claimed in claim 1, further comprising means for compensating the converted feedback signal for a global display attribute.

15. The controller claimed in claim 14, wherein the global display attribute is ambient illumination.

16. The controller claimed in claim 1, wherein the feedback signal converter includes circuitry to compensate for pixel-specific display attributes.

17. The controller claimed in claim 1, wherein the feedback signal converter includes circuitry to compensate for position-specific display attributes.

18. The controller claimed in claim 1, including means for updating the memory upon start-up.

19. The controller claimed in claim 1, wherein the controller and the display device are integrated on a common substrate.

## Appendix II - Evidence

NONE

## Appendix III – Related Proceedings

NONE